

Army Science and Technology (S&T) Path Ahead

Update for the Vice Chief of Staff

October 3, 2012

Honorable Heidi Shyu

Assistant Secretary of the Army
(Acquisition, Logistics and Technology) and
Army Acquisition Executive



DESIGN • DEVELOP • DELIVER • DOMINATE
SOLDIERS AS THE DECISIVE EDGE

Our Mission



Design, develop, deliver and sustain products and services to enable our Soldiers to dominate the battlefield today and tomorrow.

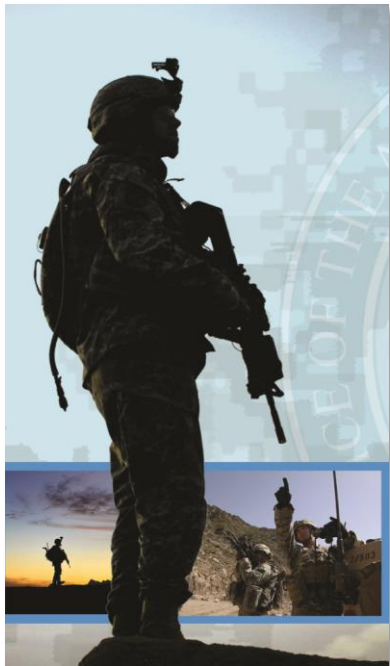
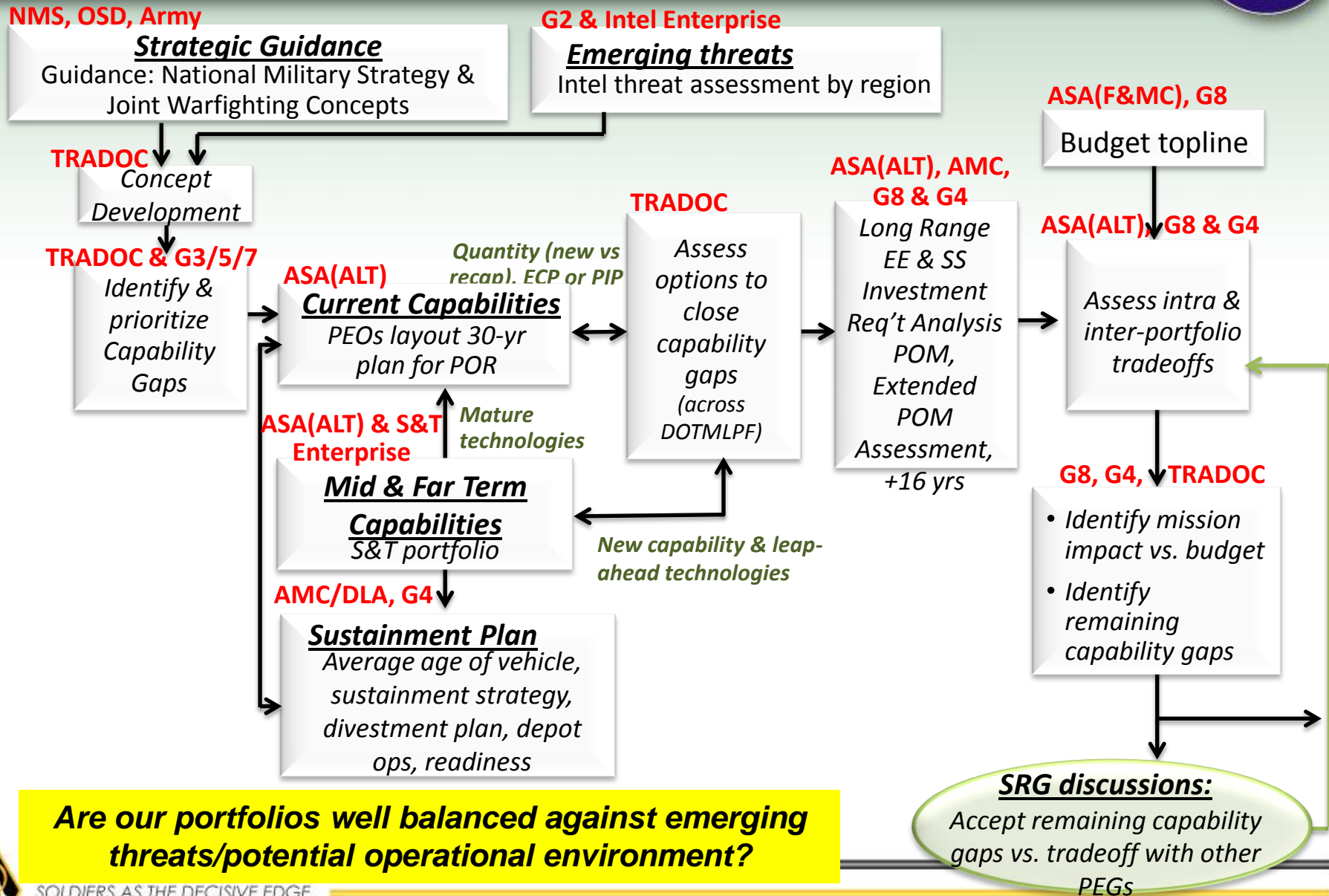


Image Source: US Army Flickr and Tom Clancy's Ghost Recon Future Soldier



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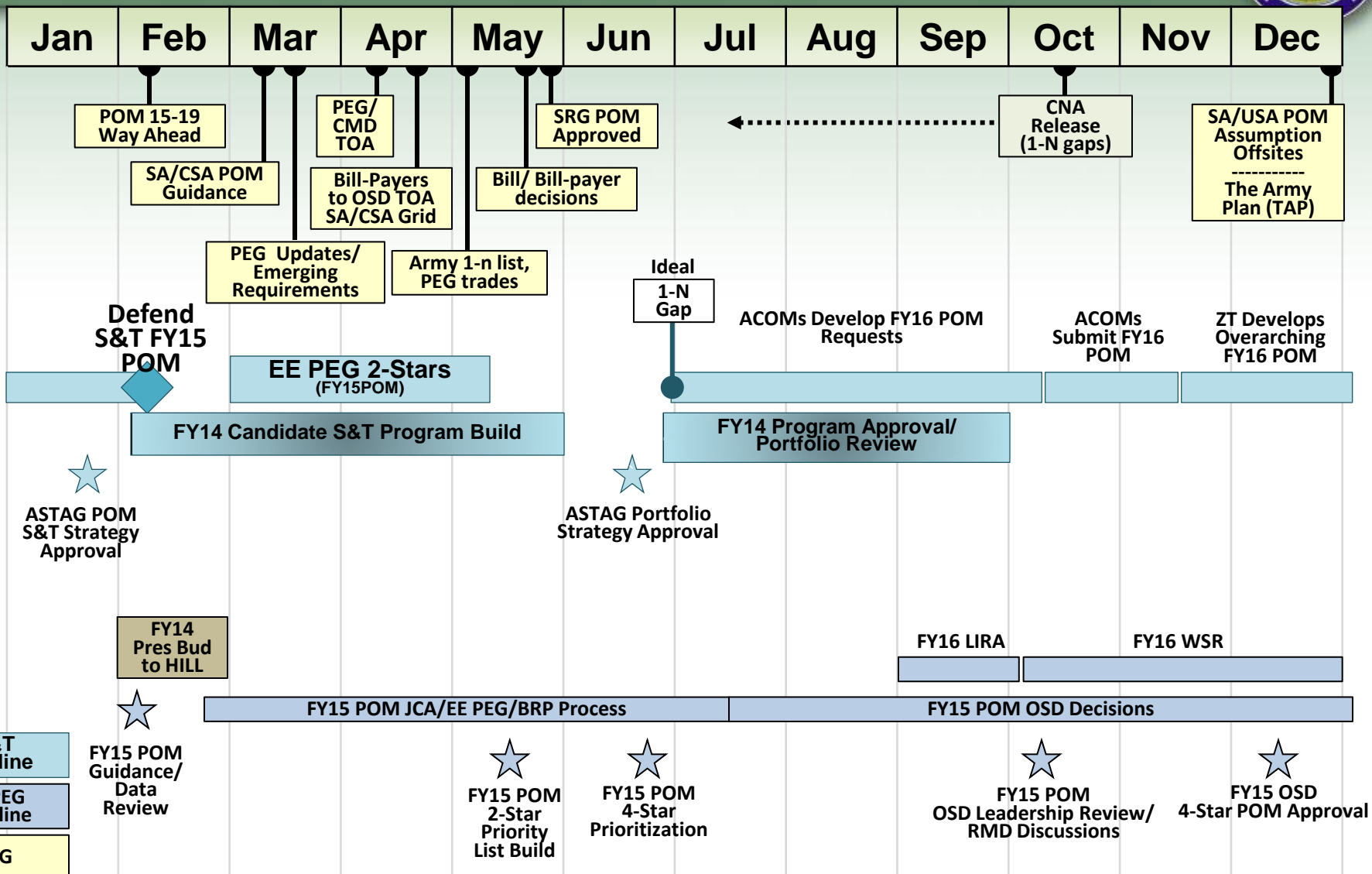
Strategic 30-Yr Look at Equipping & Sustainment





SRG Yearly Calendar

Calendar Year 2013



Strategic Path Forward



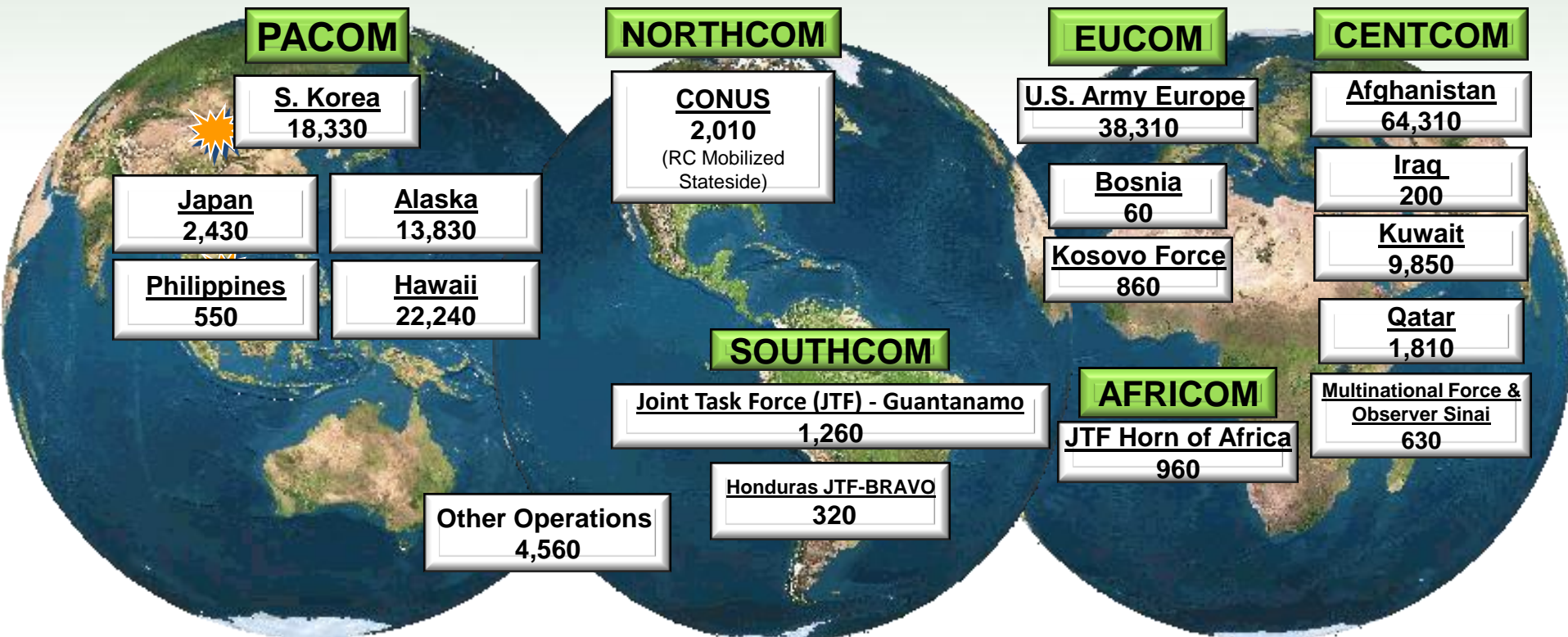
- Assess strengths, weaknesses, opportunities and threats, define critical capability gaps, map S&T strategy to close capability gaps
 - Layout 30-yr Program of Record portfolio: concept development, EMD, Production, sustainment
 - Assess S&T insertion opportunities
 - Linking sustainment strategy: average age of vehicle, upgrade plan, sunset plan
 - Balancing modernization with reset
- Link S&T portfolio into POR planning
- Strengthen S&T collaboration with other Services, FFRDCs, National Labs, academia, other Nations



The Army Must Remain Prepared for Worldwide Operations



Current Army total strength 1.1M Soldiers:
Active – 553,410 Reserve – 201,610 National Guard – 356,820



182,280 Soldiers deployed in ~160 countries

Data as of 4 Sep G3/5/7



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Diversity of Threats



Asymmetric

- IEDs
 - Mortars, artillery, rockets
 - Suicide bombers
-

- Chemical & biological agents
- Unconventional methods
- Loose nuke
- Water, electric-grid
- Kidnapping, assassination

Terrorism

Nation-State

- Cyber attack
 - Electronic Warfare (GPS, radar, communications)
 - Advanced missiles (SAM, AAM, CM)
 - Long range ballistic missiles
 - Anti-satellite (ASAT)
 - Directed Energy
 - Advanced fighters, bombers, helicopters, UAVs
 - Integrated Air Defense
 - Deeply Buried, Hardened C2
-

- Cyber attack: Financial systems
- Kidnapping , assassination

Criminal Element

These capabilities will blur across the line in a highly networked society





Army Top Challenges

- Greater **force protection (Soldier, vehicle, base)** to ensure survivability across all operations.
- Ease **overburdened** Soldiers in Small Units.
- Timely **mission command & tactical intelligence** to provide situation awareness and communications in all environments
- Reduce logistic burden of **storing, transporting, distributing** and **retrograde** of materials
- Create **operational overmatch** (enhanced lethality and accuracy)
- Achieve operational **maneuverability** in all environments and at **high operational tempo**.
- Enable ability to **operate in CBNRE environment**
- Improve **early detection of TBI**
- Improve **operational energy**
- Improve **individual & team training**
- **Reduce lifecycle cost** of future Army capabilities



Challenge Investments



Top S&T Challenges

FY14*
FY14-18*

6.2, 6.3, 6.7 Funding

\$1,641M
\$8,448M

*FY14 BES

Force
Protection

\$642M
\$3,054M

Overburden

\$117M
\$474M

MSN CMD &
Tactical
Intel

\$353M
\$1,826M

Logistics
Burden

\$27M
\$112M

Operational
Overmatch

\$189M
\$1,144M

Maneuver

\$148M
\$873M

CBRNE
Operation

\$0M**
\$0M**

Traumatic
Brain Injury

\$5M
\$40M

Operational
Energy

\$84M
\$510M

Training

\$56M
\$315M

Lifecycle
Costs

\$19M
\$98M

MSN CMD – Mission Command

CBRNE – Chemical, Biological, Radiological, Nuclear, Explosive



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Army's Challenge: Enhance Maneuverability



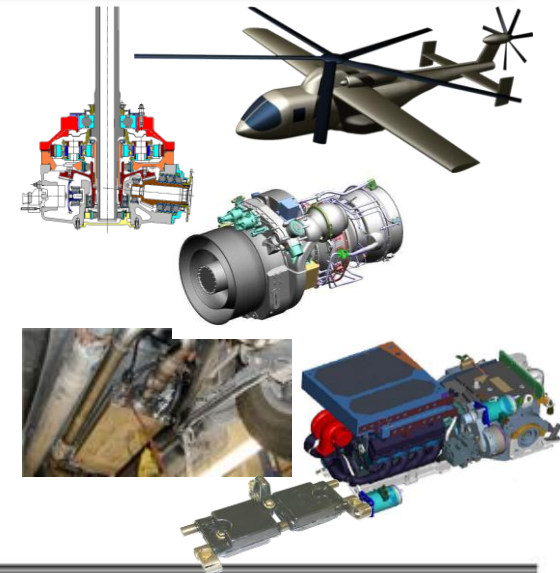
Desired Capabilities

- Higher speed, longer range aircraft
- More efficient platforms
- Mobility in all terrain
- IED / mine detection and neutralization at tactical speeds



Technology Enablers

- High speed rotor systems and low drag fuselages
- Future advanced rotorcraft drive system
- Advanced affordable turbine engine
- Vehicle management systems
- Active suspension
- Power-train, energy storage, thermal management, and friction reduction technologies for combat and tactical vehicles
- Algorithms and processing power for IED/mine detection



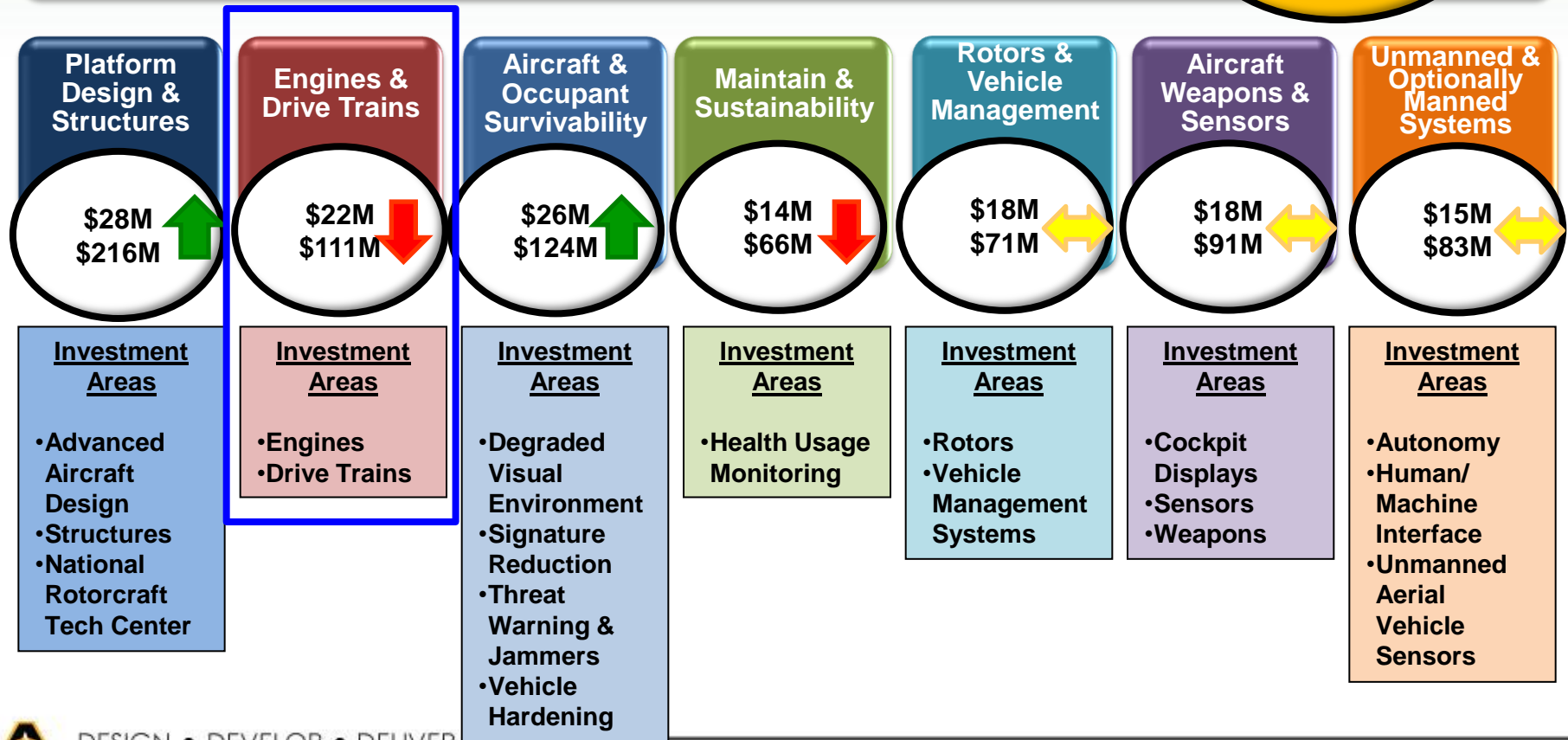
Air Portfolio Structure

FY13
FY13-17



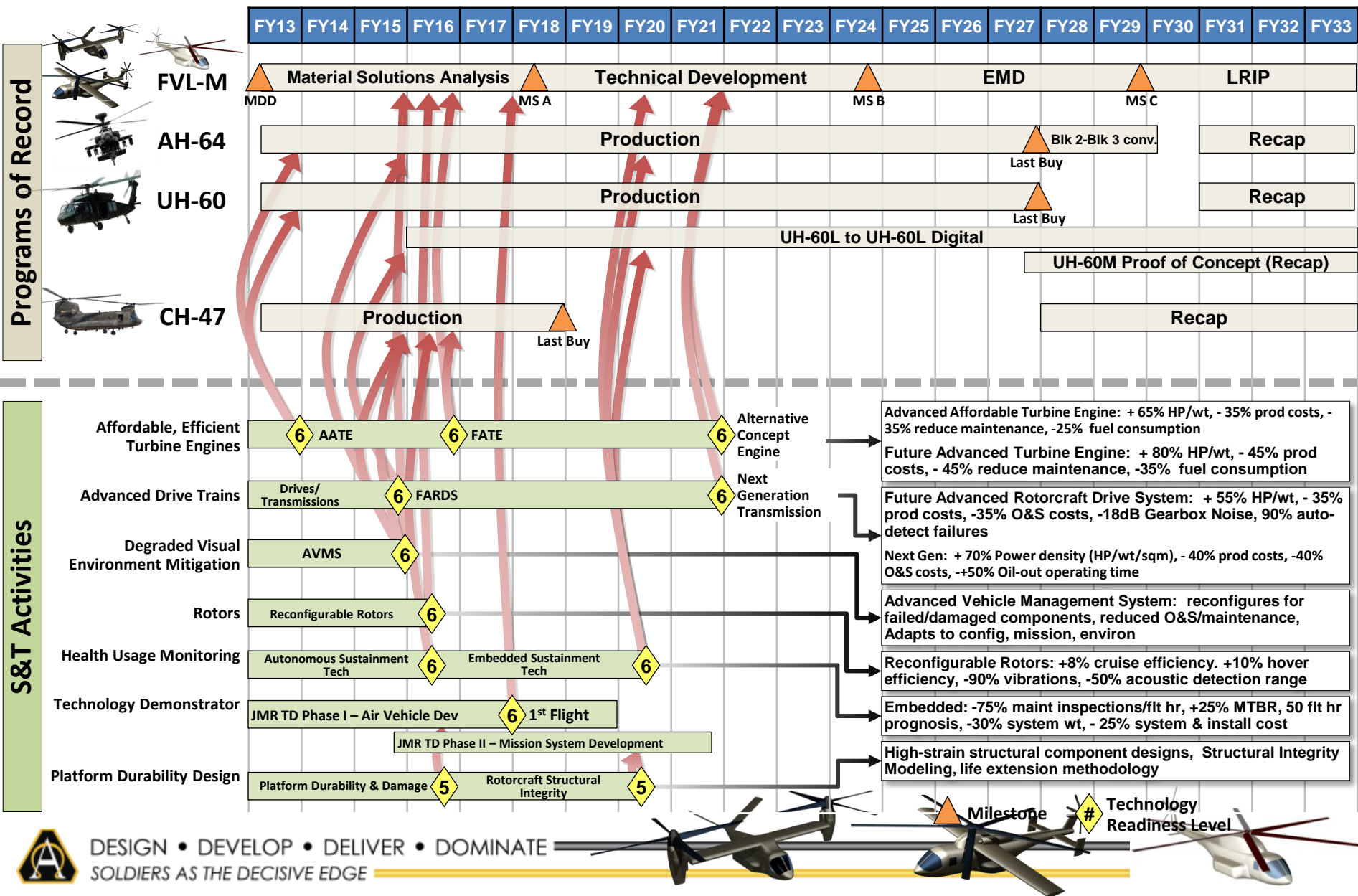
Air Portfolio 6.2 and 6.3 Funding

\$141M
\$762M





Army's Challenge: Enhance Mobility



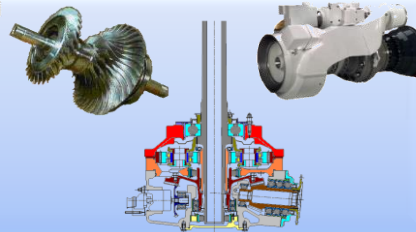
Engines & Drive Trains Sub-Portfolio



Goal: Provide increased power density to meet vertical lift operation requirements while reducing fuel usage

S&T Major Efforts include:

- 3000 shp turbine engine
- 7000 shp turbine engine
- Advanced high power density transmission



Near-term Goals:

- Develop turbine engine with 25% reduced fuel burn and 35% reduced production and maintenance costs (medium fleet)
- Develop turbine engine with 35% reduced fuel burn and 45% reduced costs (heavy fleet)
- Develop high power density transmission with 55% increased hp/wt and 35% reduced production and maintenance costs

Mid/Far-term Goals:

- Develop turbine engine with broad, high efficiency operating speed envelope
- Develop lightweight, durable multi-speed/variable speed transmission to provide variable output speed

Legacy/Existing Systems include:

- Chinook
- Apache
- Blackhawk
- Kiowa



Internal Stakeholders:

- AMRDEC
- ARL
- VAATE



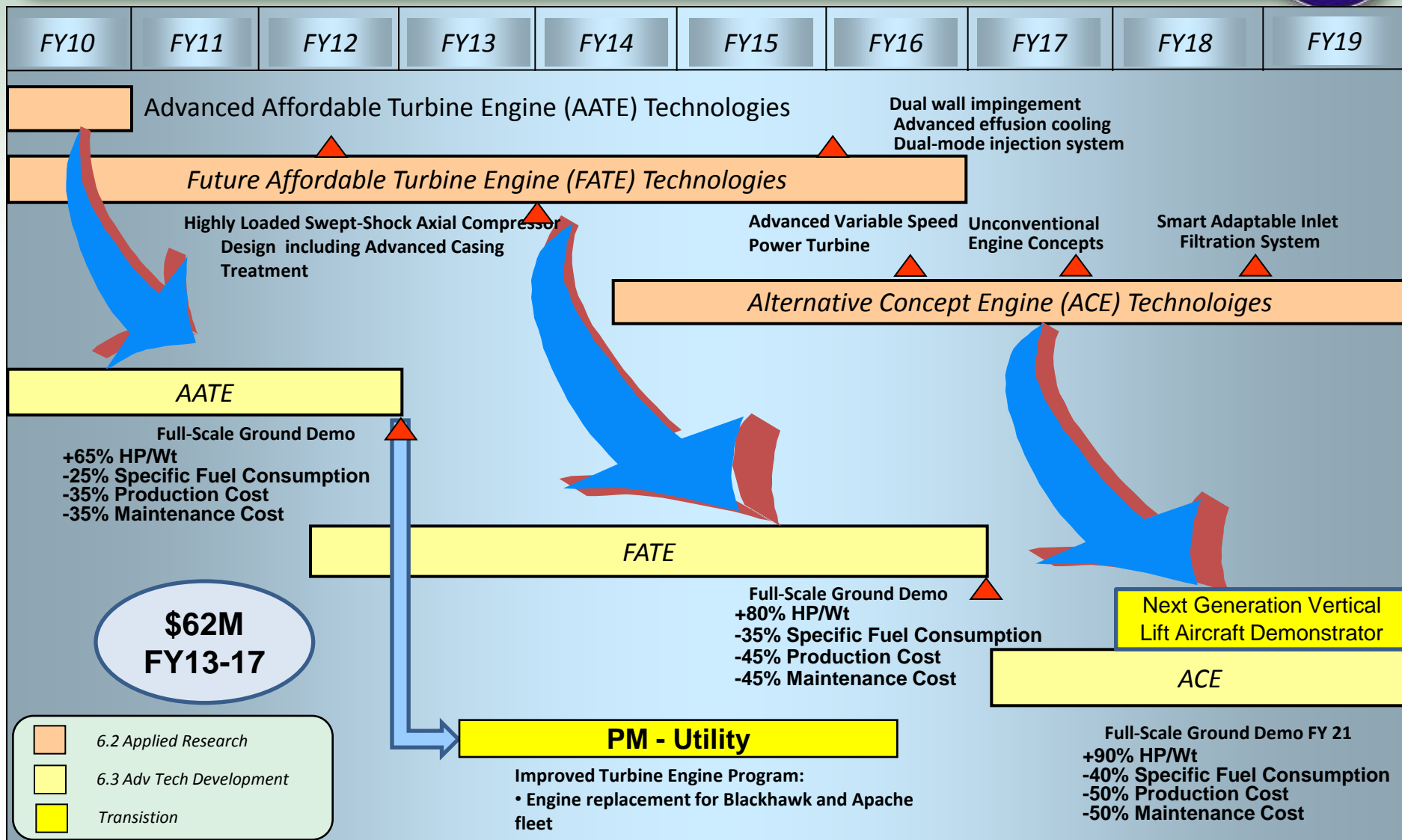
External Stakeholders:

- PEO-Avn, Platform PMs
- PM-ASE
- G-3/5/7 Aviation, G-8
- Navy/USMC
- TRADOC TCMs





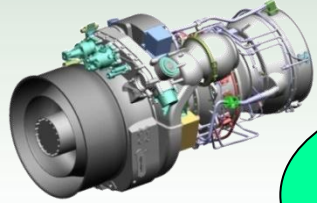
Affordable Turbine Engines



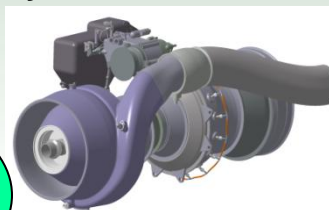


Advanced Affordable Turbine Engine

2 Contractors:
General Electric
Advanced Turbine Engine Company



+65 % Hp/wt
- 25 % Specific Fuel Consumption
- 35% Cost (\$/hp)



Purpose:

Develop advanced, affordable, 3000 hp class turboshaft engine technology providing improved operational capability for Blackhawk, Apache & other Future Force rotorcraft

Products:

- Two competing full system demos of an affordable, fuel efficient, high power/weight engine
- Technology readiness for transition to EMD engine program for UH-60/AH-64 upgrades
- Enhanced Software Design Tools to support future engine development efforts

Payoff:

- Transitioned to PM Utility Improved Turbine Engine Program
- Provides required range & payload capability for UH-60 Recapitalization
- Improved Hot/High Engine Capability for Apache & Blackhawk
- 35% Reduction in Production Cost (\$/hp) & Maintenance Cost
- Reduced logistic footprint
- Other Applications SOF, Jay Hawk, Seahawk, Joint Multi-Role Rotorcraft, HH-60 Recap

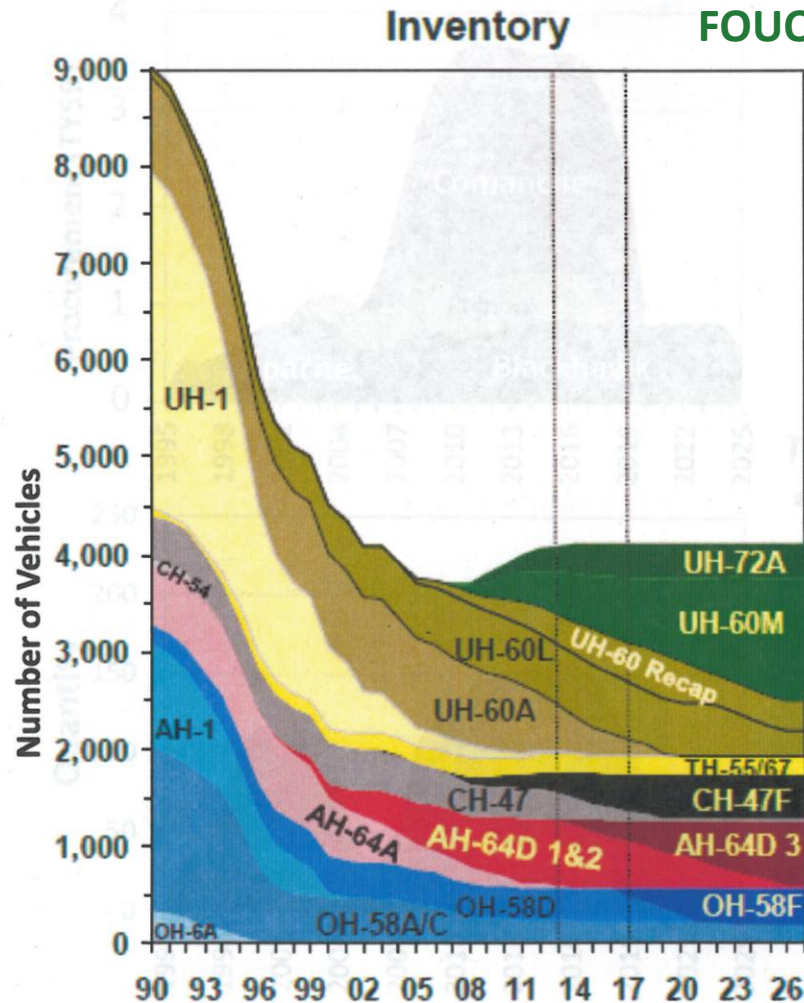
Schedule & Cost (\$M)

Milestones	FY08	FY09	FY10	FY11	FY12
Aero, Mech Designs	4				
Fabrication					
- component /rig hardware					
- engine hardware					
Component Rig Tests					
- compressor, combustor					
- turbine, mech systems					
Engine Tests					
Total D447	10.6	11.3	17.3	10.6	0.0
Air Force	0.5	0.5	0.0	0.0	0.0
GE Share	4.6	19.0	25.3	15.4	2.1
ATEC Share	10.5	36.5	17.8	4.6	6.7

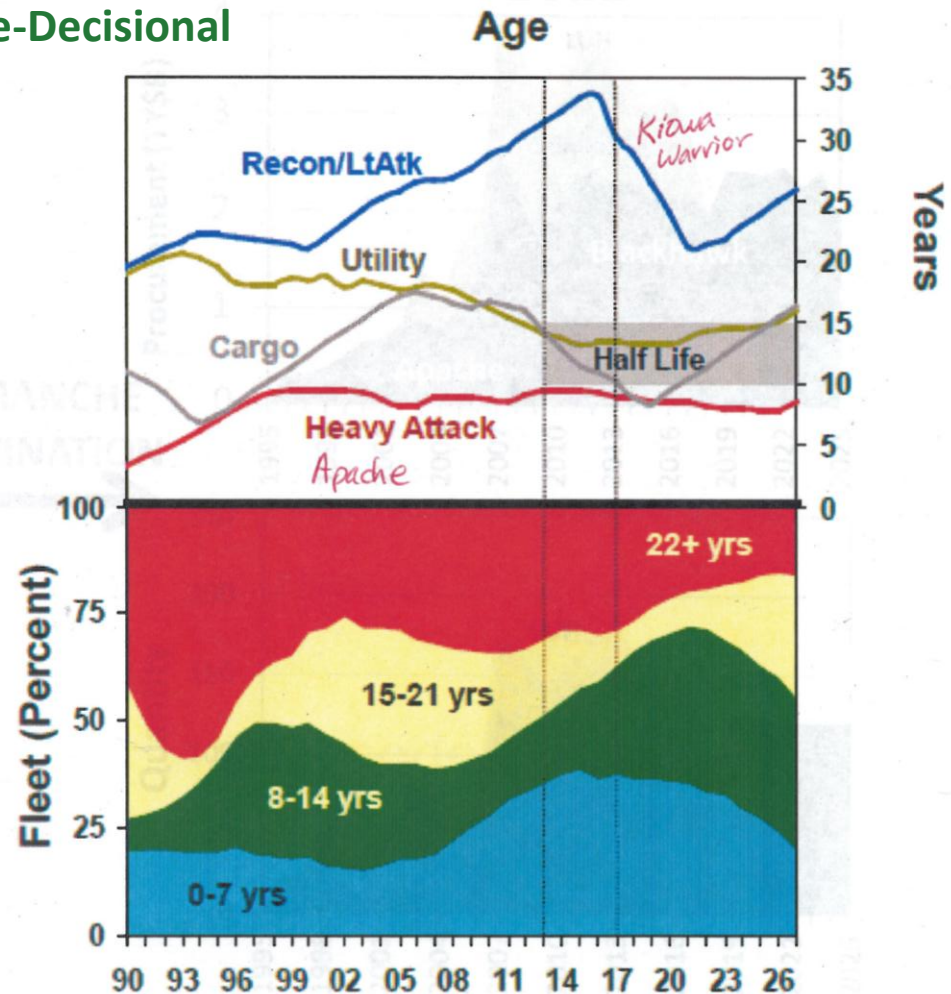


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Army Rotary Wing Inventory & Age



FOUO/Pre-Decisional



FOUO/Pre-Decisional

Source: OSD(CAPE)



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Air Portfolio Recent Significant Transitions



- Apache – AH-64
 - Manned-Unmanned Avionics Architecture
 - Video from Unmanned aircraft systems for Interoperability Teaming (VUIT-2)
 - Hostile Fire Indicator (Ground Fire Alerting System)
- Black Hawk – UH-60
 - Advanced Affordable Turbine Engine
 - Health Usage and Monitoring System
- Chinook – CH-47
 - Visual/Infrared (IR) Coatings Technology
 - Flight Control Laws
 - T-55 Engine Improvements
 - Rotor Blade Erosion



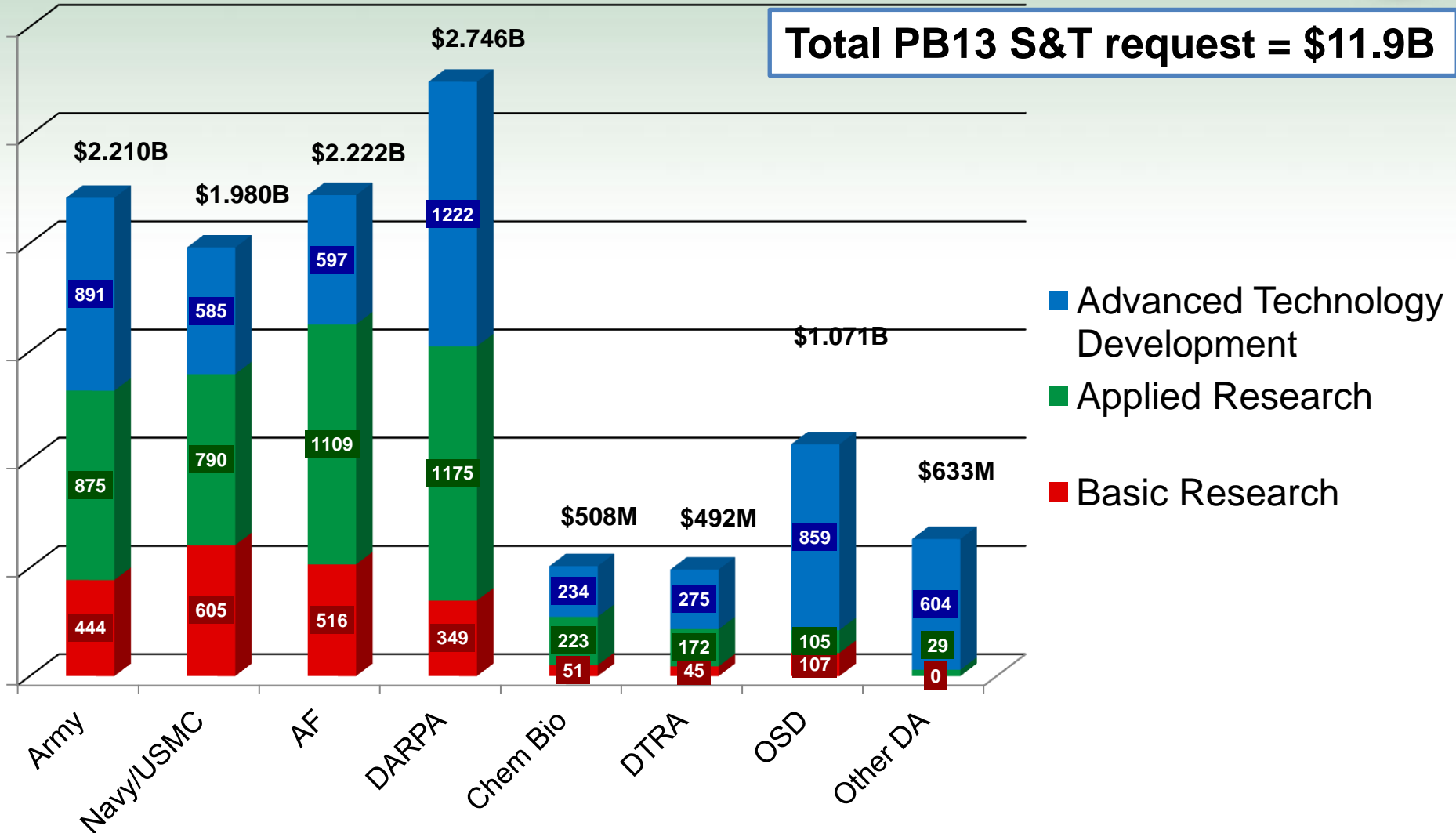
Strong legacy of successful development and demonstration



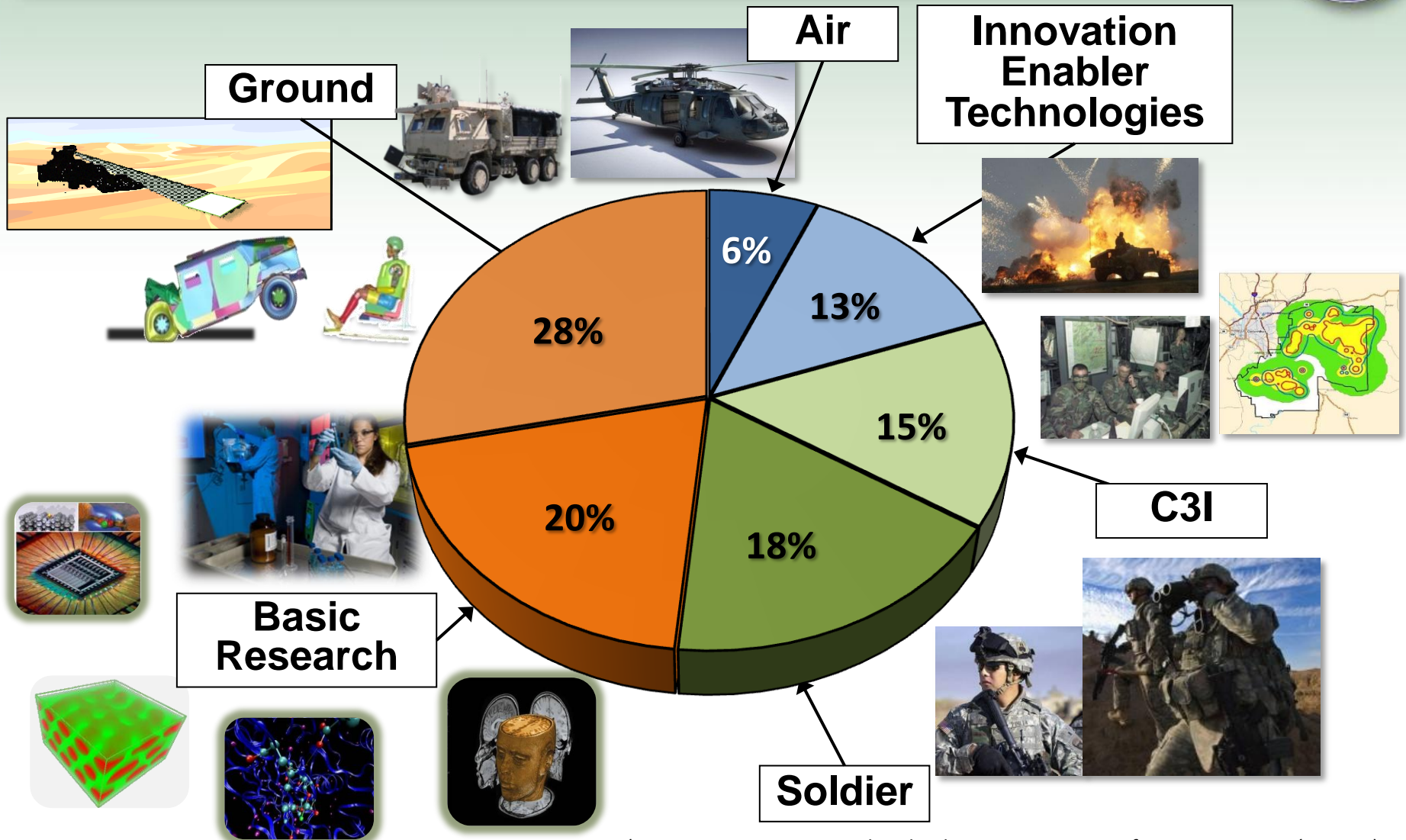
Defense S&T Funding



Total PB13 S&T request = \$11.9B



Army's S&T Portfolio*



*Source: Army Science and Technology Management Information System (ASTMIS) PB13



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Army's Technical Challenges



Basic Research Portfolio

Extramural Research (53%)

University Affiliated Research Centers

ICB - Biotechnology
ICT - Immersive Simulation & Training
ISN - Nanotechnology

Centers for Enduring Needs

Vertical Lift Research, Automotive
Research, HP Computing,
HBCU/MI

Multidisciplinary University
Research Initiatives

University Single
Investigator Program
~ 1200 grants, ~340 schools

In-house Research (36%)

Core programs – AMC,
MRMC, ERDC, ARI, SMDC

ILIR

Collaborative Technology / Research Alliances (11%)

Lab, academia, and industry –
Robotics, Micro Autonomous Systems
Technology, Network Science, Cognition and
Neuroergonomics, Multiscale Materials

Network & Info Science
International Technology
Alliance (US/UK)



Basic Research Investments



Basic Research Portfolio

FY13*
FY13-17*

6.1 Funding

\$444M
\$2341M

*PresBud Request FY13

Human Centric

\$70M
\$364M

Investment Areas

- Life Sciences
- Behavioral
- Training
- Neuroscience
- Medical

Information Centric

\$53M
\$298M

Investment Areas

- Computing
- Cyber
- Decision Making
- Network Sciences

Material Centric

\$155M
\$816M

Investment Areas

- Classical Sciences
- Materials Modeling
- Biotechnology
- Nanotechnology
- Environment

Platform Centric

\$47M
\$253M

Investment Areas

- Simulation
- Autonomy
- Vehicles

Enrichment Initiatives

\$118M
\$611M

Investment Areas

- University Research Initiatives
- Innovative Lab Research
- Educational Outreach
- Foreign Technology

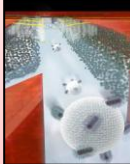


University Based Basic Research



University Affiliated Research Centers

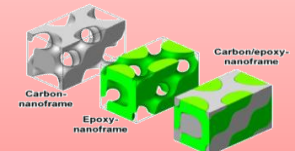
Institute for Collaborative Biotechnology – UCSB, CalTech, MIT
Bio-inspired materials, sensing, energy-storage, networks, and neuroscience



Institute for Creative Technology – USC
Immersive simulation and training, Human-Virtual to Human interactions, PTSD therapy

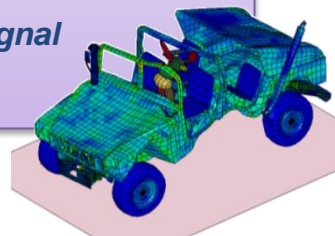
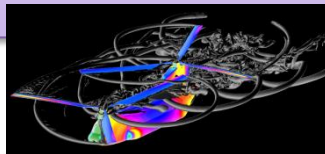


Institute for Soldier Nanotechnology – MIT
Nano materials, fibers, sensing, medical



Centers of Excellence for Enduring Army Needs

- **Vertical Lift Research Centers –**
Penn State, Georgia Tech, University of Maryland
Improve tactical mobility, reduce logistics blueprint and increase survivability for rotary wing vehicles
- **Automotive Research Center –**
University of Michigan
Leverage commercial technology for Army vehicle systems
- **HBCU/MI Partnerships in Research Transitions –**
Howard, Hampton, NC A&T, Delaware State
Advanced algorithms, Bayesian Imaging and signal processing for landmines and IED detect



Multidisciplinary University Research Initiatives

includes

- Defense University Research Instrumentation Program
- Presidential Early Career Award for Scientists and Engineers

University Single Investigator Program

~ 1200 grants, ~340 universities
Basic Research in physical sciences, mathematics, life sciences, engineering



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Collaborative Technology / Research Alliances



Robotics –

General Dynamics Robotics Systems,
Carnegie Mellon, Florida A&M, U. Penn, JPL

*Expand technologies available for future
unmanned systems with ability to team with
Soldiers; Develop foundational
manipulation / mobility behaviors*



Micro Autonomous Systems Technology –

BAE, Jet Propulsion Lab, U. Maryland, U.
Michigan, U. Penn

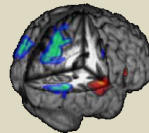
*Microsystem mechanics, processing for
autonomous operation, microelectronics and
platform integration*



Cognition and Neuroergonomics –

DCS Corp, Taiwan Brain Research Center,
UC San Diego, U. Michigan, U. Texas

*Understand how the brain works to optimize system
design; understand soldier neurocognitive
performance in operational environments,*



Materials in Extreme Dynamic Environments –

JHU, CalTech, Rutgers, U. Delaware

Understanding materials under high strain-rates

Multiscale Multidisciplinary Modeling of Electronic Mat. –
U. Utah, Boston U., Rensselaer Polytechnic Institute

*Microscale properties to design macroscale behavior
for electronics*

Network Science –

BBN, Penn State, U. Illinois-Urbana
Champaign, Rensselaer Polytechnic Inst.

*Communications networks, interplay of
social/cognitive info; affect of one network
on another*

Network & Information Science International
Technology Alliance –

US/UK alliance led by IBM

*Network operations in
Coalition environments*

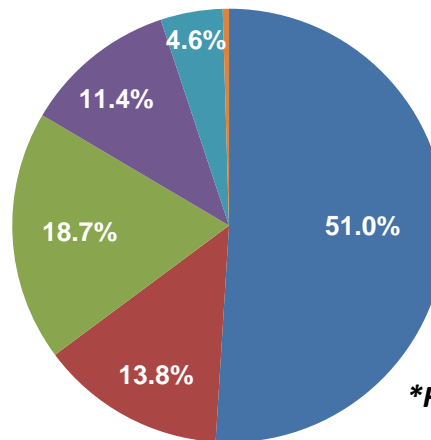
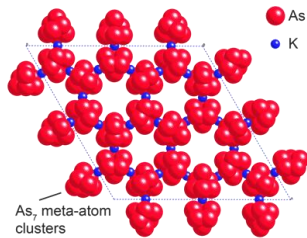
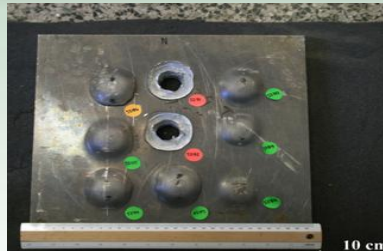


In-House Basic Research



AMC/RDECOM –

*Armor & Energetic Materials
Sensors and Electronics
Neuroergonomics
Human-Robotic Interaction
Air and Ground Vehicle Technology
Armaments
Combat Feeding
Chem/Bio Surface Science*



**FY13 Request
In-house Only*

ERDC –

*Environmental Science
Training Land Natural
Resources and Sustainability*



MRMC –

*Infectious Diseases
Operational Medicine
Combat Casualty Care
Traumatic Brain Injury
Rehabilitative Medicine*



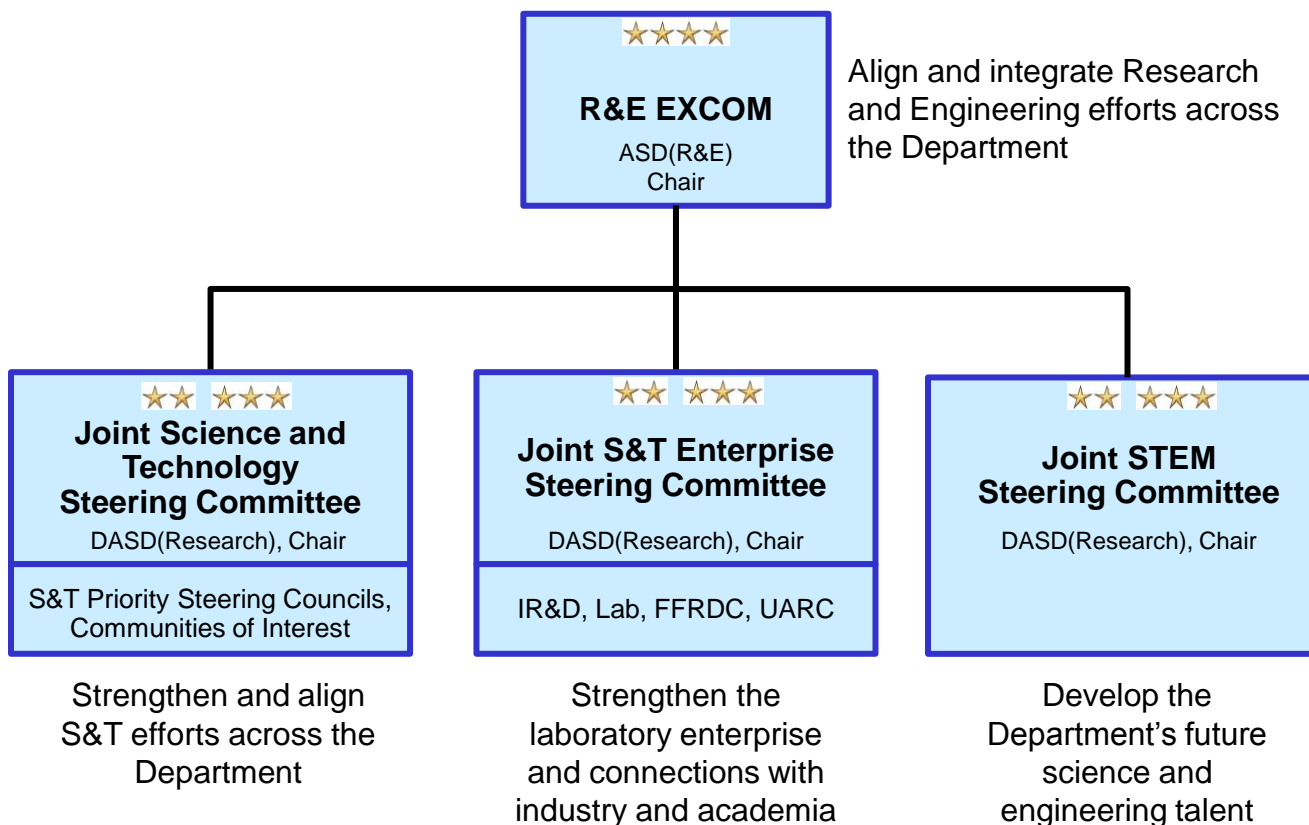
ARI –

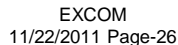
*Personnel Measures
Leader Development
Training Effectiveness*





Realignment and Focus of Existing R&E EXCOM Elements





Backup

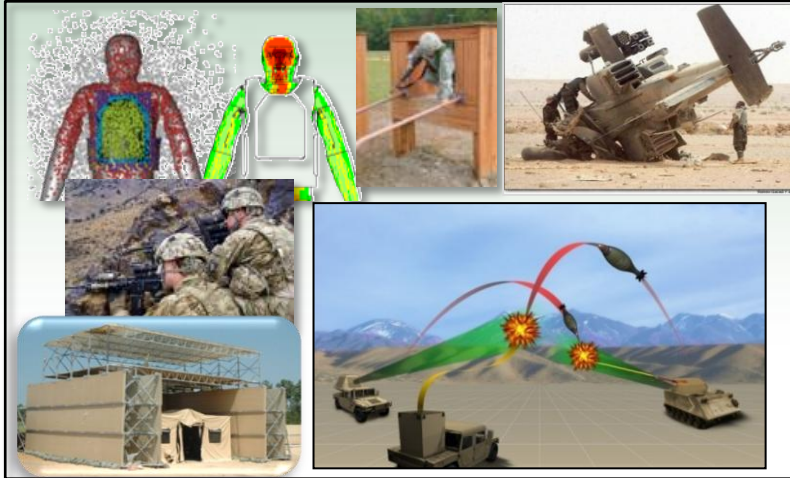




Greater ***force protection (Soldier, vehicle, base)*** to ensure survivability across all operations



Army's Challenge: Enhance Protection

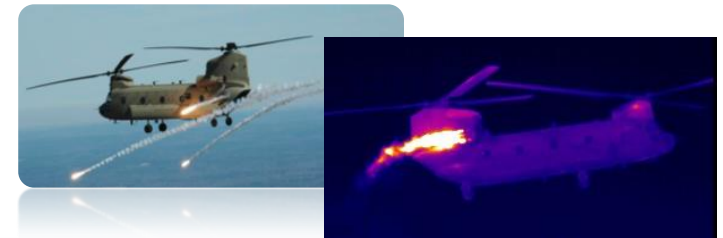
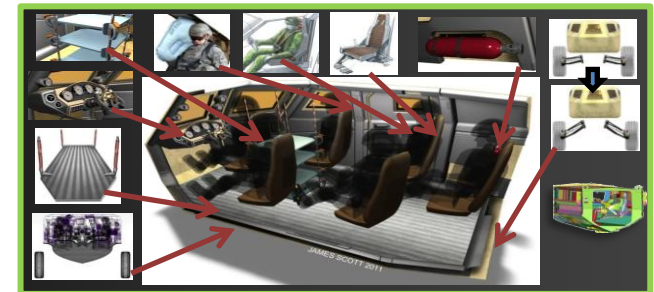


Desired Capabilities

- Holistic protection for Soldiers, ground, and air vehicles and operating bases
- Lighter and more capable protection against a wide range of threats
- Improved concealment, deception and threat avoidance

Technology Enablers

- Multi-function, lighter-weight materials with improved properties
- Novel components and systems for active and passive protection of platforms and bases
- Multi-band signature management and countermeasures
- Design tools, hi-fidelity models, robust simulations and improved test methodologies



Army's Challenge: Improved Combat Casualty Care



Desired Capabilities

- Hemorrhage control and resuscitation
- Comprehensive intensive care and enroute care
- Diagnose, predict and improve treatment of traumatic battlefield injuries

Technology Enablers

- Improved blood platelet storage and clotting of trauma injuries
- Learning algorithms to predict severity of injury and improve ventilation strategies
- Enhanced methods of regenerative medicine for improved bone and nerve gap repairs
- Novel stem cell therapies for wound healing
- Medical products for the treatment of the face and mouth, burns and scars, hard and soft tissue, volumetric muscle loss, and immune modulation





Ease ***overburdened*** Soldiers and Squads in Small Units



Army's Challenge: Lighten the Load - physical and cognitive



Desired Capabilities

- Lightweight, mission tailorable equipment and energy assets
- Improved ease of use for new systems
- Improved Soldier readiness
- Autonomous offloading of equipment
- Precision re-supply

Technology Enablers

- Composite materials and miniature sensor systems
- Bio-sensors, personal area networks, and algorithms
- Accurate, more comprehensive assessment methods of Soldier knowledge, skills, abilities and resiliency
- Nutritional, physiological and cognitive research
- Holistic human system analysis and integration
- Decision making tools

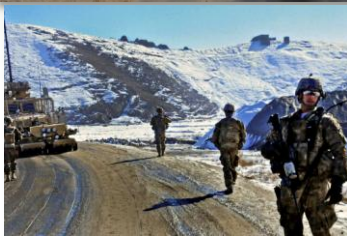




Timely ***mission command & tactical intelligence*** to provide situation awareness and communications in all environments



Army's Challenge: Improve Tactical Intelligence

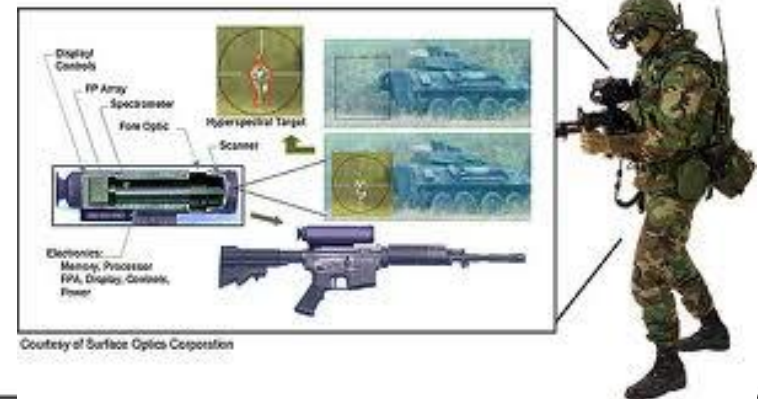


Desired Capabilities

- Avoid tactical and operational surprise
- Persistent Intelligence, Surveillance, and Reconnaissance (ISR) to detect and track threats, to include vehicles and dismounts
- Identification and discrimination of threats
- Actionable intelligence down to the squad level

Technology Enablers

- Light Detection and Ranging (LiDAR) sensors
- Integrated Electro Optical (EO/IR)/Long Wave Infrared, Millimeter Wave (MMW) radar
- Foliage penetration radar
- Hyper-spectral imaging
- Integrated dismount tracking with ID algorithm
- Apps to enhance multi-intelligence integration
- Algorithms to fuse data and decrease false alarms



Army's Challenge: Mission Command – Counter Cyber and Electronic Warfare (EW) Threats

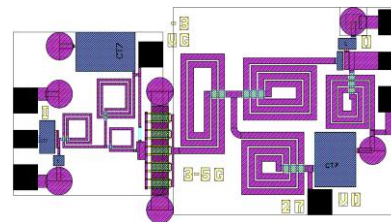


Desired Capabilities

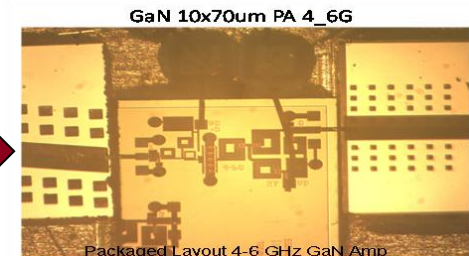
- Operate in a cyber battlefield (offensive and defensive)
- Operate in complex EW environments (RF, GPS, communications, radar, jamming)

Technology Enablers

- Chip-scale atomic clocks for ultra-precise timing
- Adaptive wide-band RF components
- Integrated Electronic Warfare systems to enable adaptive sense & avoid
- Trusted foundry chips, design-for-trust
- Trusted software
- Resilient architecture and framework
- Identity management
- Polymorphic code
- Dynamic monitoring to detect, analyze, respond and protect against unauthorized activity



C-band MMIC PA, Designed & Modeled



Packaged Layout 4-6 GHz GaN Amp
C-band MMIC PA, Fab'd & Tested



Army's Challenge: Mission Command – Enhance Connectivity

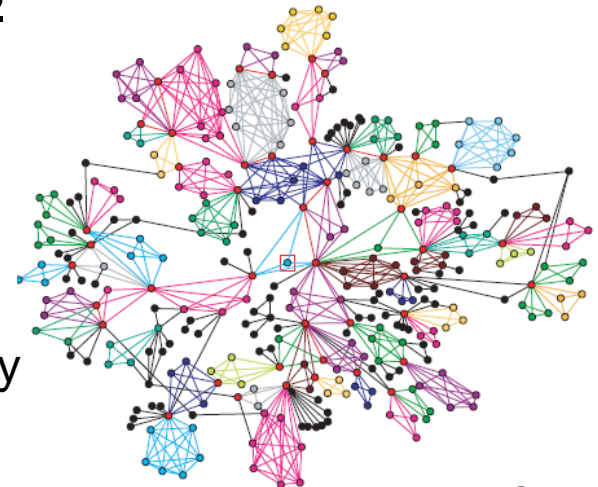


Desired Capabilities

- Assured connectivity on the move
- Secure reliable communication at all levels
- Interoperability with coalition forces
- Cross domain access to unclassified, classified & coalition networks
- Common operating environment

Technology Enablers

- Integrated end-to-end secure network architecture
- Dynamic spectrum access
- Conformal multi-band antennas
- Self-healing, self-forming network
- Multi-channel, multi-waveform devices
- Software and algorithms to support multi-level security
- Integrated communications/EW architecture
- Flexible adaptive network manager





Reduce logistic burden of ***storing, transporting, distributing and retrograde*** of materials



Army's Challenge: Enhance Transportation, Distribution and Waste Management



Desired Capabilities

- Improve capability to tactically transport and reliably deliver and retrograde supplies and waste to/from forward operating positions
- Improve consumable efficiencies of Forward Operating Bases (FOBs) and remote bases

Technology Enablers

- Distribution Management Tool that optimizes scheduling of tactical transport modes to more efficiently distribute sustainment
- Technology to monitor consumption and optimize energy efficiency
- Autonomous convoy/delivery technologies
- Low-cost, precision air drop
- Waste to energy conversion and waste reduction techniques
- Water recycling, repurposing and management techniques



Army's Challenge: Enable Environmentally Sustainable Operations



Desired Capabilities

- Increased training land availability
- Optimized infrastructure life-cycle planning and operation
- Improved speed and safety for fielding new materiel solutions
- Environmental lifecycle assessment tools that support acquisition decisions

Technology Enablers

- Predictive software tools for determining energy losses in building envelopes
- Planning tools and lifecycle models for energy, water, waste resource optimization
- Novel detection, remediation, and mitigation methodologies for emerging energetic materials
- Predictive tools and algorithms for fate, transport and effects of chemicals and materials to aid in development of insensitive, sustainable energetic materials
- Assessment tools for identifying cumulative environmental impacts on training lands
- Analytical software tools for adaptive range and installation management due to climate change





Create ***operational overmatch***
(enhanced lethality and accuracy)



Army's Challenge: Enhance Lethality



Next Gen KE



M855A1



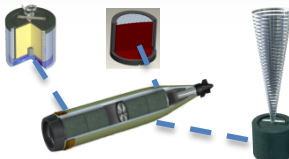
High-Energy Laser
Technology Demonstrator



Low Cost Tactical Extended Range Missile



Close Combat Missile
Modernization



Cluster Munitions
Replacement

Desired Capabilities

- Maintain lethal overmatch
- Increased accuracy
- Extended ranges
- Scalable, tailorable effects
- Ability to operate in GPS-denied environment
- Ability to effectively engage moving targets

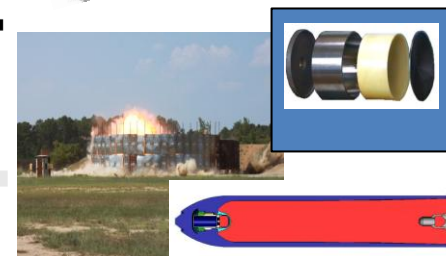
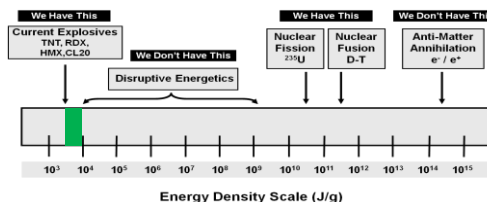
Technology Enablers

- Selectable and Multi-Purpose Warheads
- Green kinetic-energy penetrator for Small Arms ammunition and Tank-fired rounds
- Reduced-weight weapon components
- Guidance & Fire Control technologies
- Propulsion technologies
- Disruptive Energetics (3-10x)
- Directed-energy weapons

High G, Miniaturized, Modular, Precision
Target Sensor



Javelin Multi-purpose
Warhead



Selectable Yield Unitary Warhead

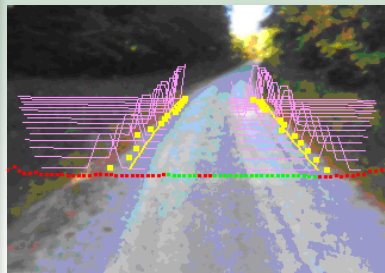




Achieve operational
maneuverability in all
environments and at ***high***
operational tempo



Army's Challenge: Enhance Operational Autonomy



Desired Capabilities

- Trusted assets which operationally react to the complexity of the battlefield
- Autonomous assets to accomplish routine and high-risk mission tasks
- Scalable autonomy allowing human intervention or manned/unmanned teaming

Technology Enablers

- Autonomous behaviors algorithms for UAS dynamic replanning and contingency management
- Ground vehicle autonomy technologies to provide improved learning and manipulation to enable Soldier trust
- Algorithms for scalable autonomy intervention on existing tactical vehicles from driver assist to leader/follower
- Manned/unmanned autonomous behavior logic
- Autonomous material handling technology





Enable ability to *operate in* *CBRNE environment*



Army's Challenge: Enable Operation in Chem/Bio Environment



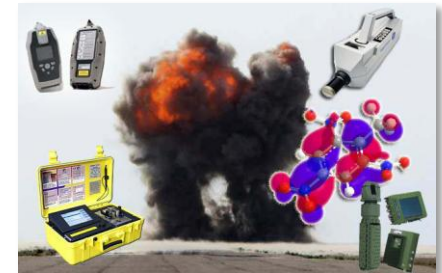
Desired Capabilities

- System integration of Defense Threat Reduction Agency (DTRA) Joint Program Executive Office (JPEO) Chem/Bio technologies with other battlefield assets, including medical countermeasures
- Integrated detection devices
- Technical expertise in fibers, Soldier and human systems, and human system integration to execute DTRA projects



Technology Enablers

- Novel materials for decontamination/inactivation of agents built into uniforms or "second skin"
- Integration of new protective mask capabilities into head protection systems
- Predictive models of human cognitive and physical performance while encapsulated
- Human Systems Integration engineering support for Program Managers





Improve *early detection of TBI*



Army's Challenge: Improve Early Detection of TBI



Desired Capabilities

- On-scene TBI assessment and diagnosis
- Effective treatment of TBI



Technology Enablers

- Biochemical research of specific biomarkers that indicate TBI to complete a field assay for the detection of TBI
- Novel drugs and therapeutic strategies and selective cooling to manage TBI
- Provide more effective assessment and intervention capabilities to mitigate the effects of combat on brain function





Improve *operational energy*

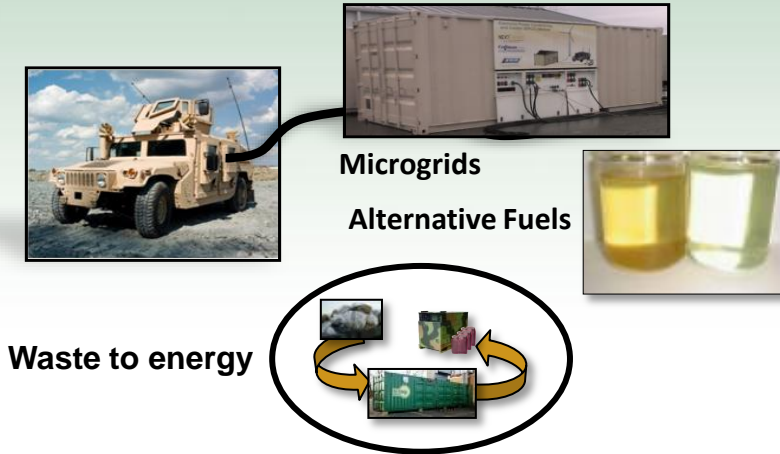


Army's Challenge: Improve Operational Energy



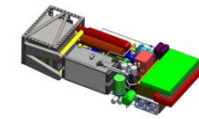
Desired Capabilities

- Increased Platform Fuel Efficiency
- Lighter, more powerful Soldier power sources
- Reduced Logistics Demand
- Energy-efficient structures and devices

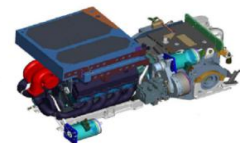


Technology Enablers

- Advanced turbine engines
- High efficiency drive systems
- Electrochemical power sources for longer lasting power
- Wearable Power (fuel cells, new battery chemistries, energy harvesting, distribution) and recharging capability for improved mobility
- Alternative energy to reduce logistics
- Generators with multi-fuel use
- Intelligent power management
- Waste to energy conversion
- Energy loss models and management tools
- Materials and design of energy efficient structures



Electric Power
for Silent Watch



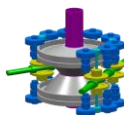
Efficient Powertrain
Technologies



Advanced
Affordable
Turbine Engine



Integrated
Energy
Harvesters



Advanced
Rotorcraft
Drive
System





Improve *individual & team training*





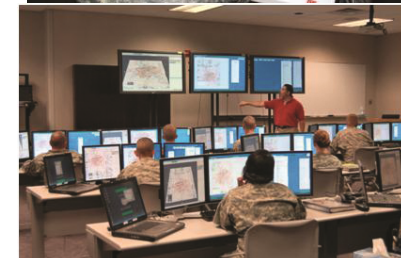
Army's Challenge: Individual & Collective Training

Desired Capabilities

- Live-Virtual-Constructive-Gaming (LVCG) and Immersive tools (anywhere, anyplace)
- Training and innovative learning methods
- Tools to manage, integrate and develop training events
- Realistic-Mission Command Centric integrated environments
- Increased training land availability

Technology Enablers

- Cognitive architecture for realistic virtual humans, with better social simulation tools
- Embedded training applications, mobile learning, integrated tutors
- Adaptation of commercially available electronics combined with LVCG and authoring tools for realistic anywhere, anyplace training events
- Mixed/Augmented reality hardware and software components that facilitate cognitive/emotional stressor, smells, and natural movements within LVCG and immersive environments
- Assessment tools for identifying cumulative environmental impacts on training lands





Reduce lifecycle cost of future Army capabilities

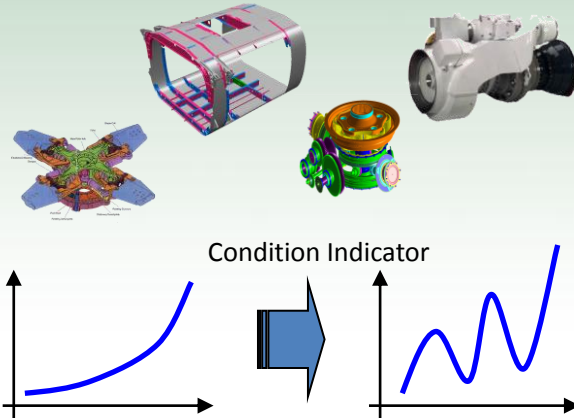


Army's Challenge: Reduce Lifecycle Cost



Desired Capabilities

- Sustainable and affordable components and systems
- Low cost per unit, reduced SWAP, streamlined / simple man-machine interfaces
- Systems that are manufacturable at low cost
- Reduced logistics footprint
- Reduce environmental impact of acquisition systems during training and operations



Technology Enablers

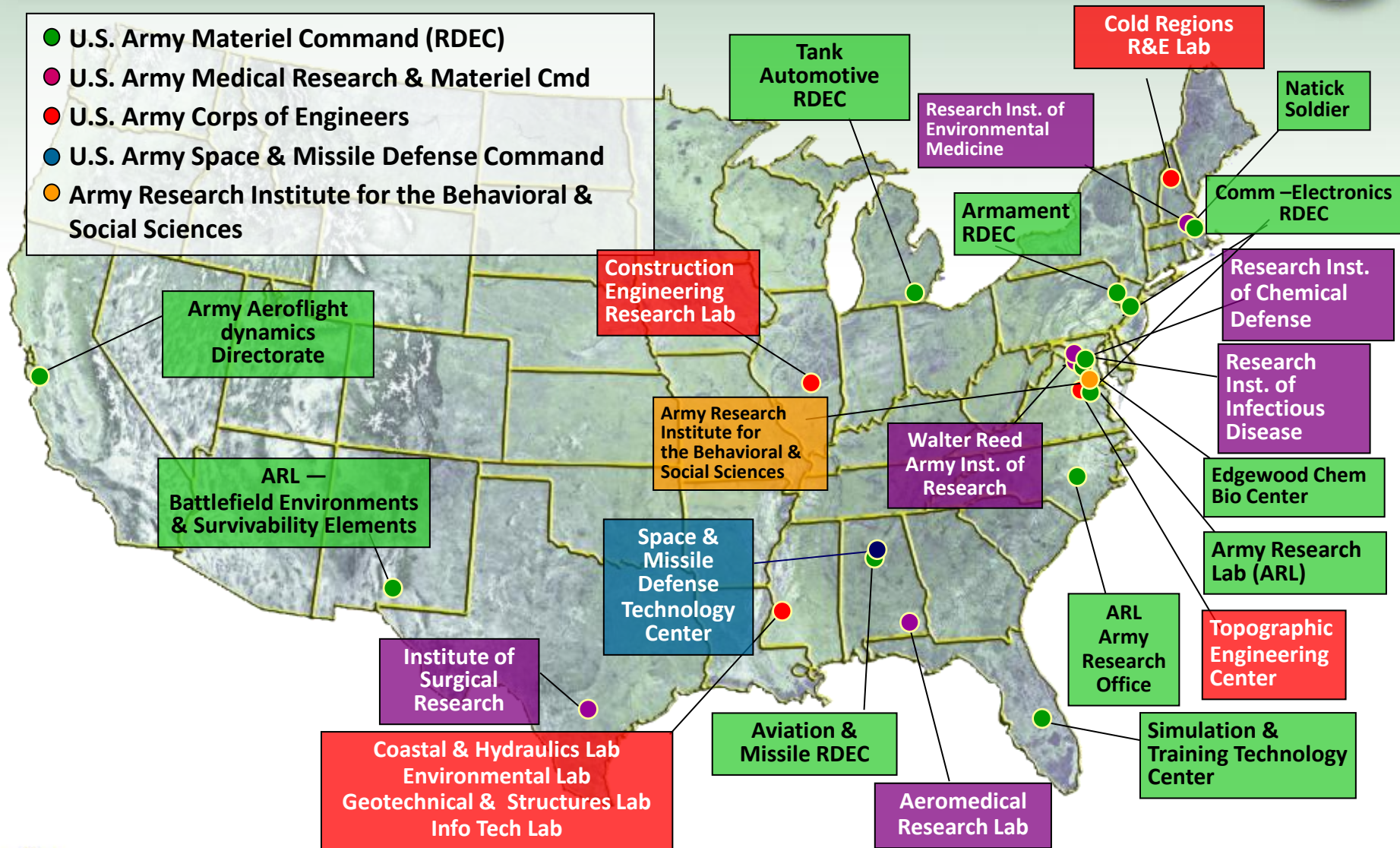
- Environmental lifecycle assessment tools supporting acquisition decisions
- Planning tools and lifecycle models for energy, water, waste resource optimization
- Small, lighter, and cheaper weapons/munitions components
- Efficient manufacturing processes and packaging techniques
- Sensing and algorithms to support condition-based maintenance
- Novel prediction, detection, remediation, and mitigation methodologies for environmental impact of emerging materials



Army S&T Laboratories and Centers



- U.S. Army Materiel Command (RDEC)
- U.S. Army Medical Research & Materiel Cmd
- U.S. Army Corps of Engineers
- U.S. Army Space & Missile Defense Command
- Army Research Institute for the Behavioral & Social Sciences



Army S&T Workforce*



Total Civilian Manpower: ~19,000



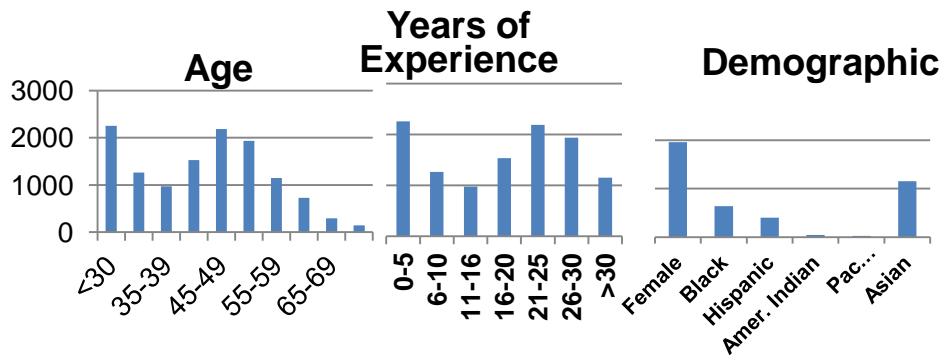
- ~ 12,000 Scientists & Engineers
- ~ 7,000 Technicians, Analysts, & Admin
- ~10% new hires per year
- ~ 450 Military S&E
- ~ 6500 Contractor S&E and support

Experience & Expertise

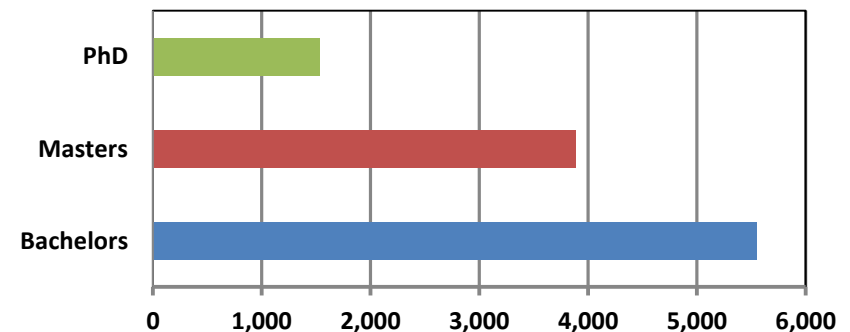


- ~ 2000 deployed & deployable employees:
- Matrix support to JPEO/PEO offices – acquisition certification

Diversity



*Civilian S&E Workforce Degrees**



*Source: 2010 Army Science and Technology Master Plan



DESIGN • DEVELOP • DELIVER • DOMINATE
SOLDIERS AS THE DECISIVE EDGE